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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/882,046	06/18/2001	Marcos C. Tzannes	081513-77	1382
22204	7590	03/29/2004	EXAMINER	
NIXON PEABODY, LLP 401 9TH STREET, NW SUITE 900 WASHINGTON, DC 20004-2128			TORRES, JOSEPH D	
			ART UNIT	PAPER NUMBER
			2133	6

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/882,046

Applicant(s)

TZANNES ET AL.

Examiner

Joseph D. Torres

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 13-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. <u>6</u> . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>5</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-12, drawn to Modulation for FEC Code by Designation of a Coset of a Constellation, classified in class 714, subclass 776.
 - II. Claims 13-36, drawn to Determining an LDPC Matrix using Data Rate and Latency, classified in class 714, subclass 774.

The inventions are distinct, each from the other because of the following reasons:

Inventions Group I, Modulation for FEC Code by Designation of a Coset of a Constellation, and Group II, Determining an LDPC Matrix using Data Rate and Latency, are related as subcombinations disclosed as usable together in a single combination.

The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention Group I, Modulation for FEC Code by Designation of a Coset of a Constellation, has separate utility such as in an adaptive modulation scheme whereby an FEC code is adaptively modulated onto a symbol. In the instant case, invention Group II, Determining an LDPC Matrix using Data Rate and Latency, has separate utility such as in adaptive error correction whereby an appropriate error correcting code is selected based on channel parameters. See MPEP § 806.05(d).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Jason Vick on 17 March 2004 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-12. Affirmation of this election must be made by applicant in replying to this Office action. Claims 13-16 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

2. The information disclosure statement filed 18 December 2001 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

One of the references as indicated on the 1449 was not submitted.

Oath/Declaration

3. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It does not identify the mailing address of each inventor. A mailing address is an address at which an inventor customarily receives his or her mail and may be either a home or business address. The mailing address should include the ZIP Code designation. The mailing address may be provided in an application data sheet or a supplemental oath or declaration. See 37 CFR 1.63(c) and 37 CFR 1.76.

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It does not identify the city and either state or foreign country of residence of each inventor. The residence information may be provided on either on an application data sheet or supplemental oath or declaration.

Drawings

4. The drawings are objected to because 'S110' and '100' in Figure 5 overlap. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "100" has been used to designate both a node in Figure 1 and a Begin block in Figure 5. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 'S110' in figure 5 and 'S410' in Figure 6. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 'S100' in paragraph [0059]. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

5. The disclosure is objected to because of the following informalities: Claim 1 recites, "designating a coset of the at least one constellation using the FEC coded bit signals". Merriam-Webster's dictionary defines coset as a subset of a mathematical group that consists of all the products obtained by multiplying either on the right or the left a fixed element of the group by each of the elements of a given subgroup. Nowhere in the application does the applicant teach such a structure. For now, the Examiner assumes that the Applicant intended subset in place of coset.

Appropriate correction is required.

Claim Objections

6. Claims 1-12 are objected to because of the following informalities: "more than one bit signal" in line 7 should be changed to -- more than a one bit signal --, if that is what was intended.

Claim 2 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to

cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. A modulated transmission channel is always either a single-carrier or multicarrier modulation.

Claims 2-12 depend from claim 1, hence inherit the deficiencies in claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 1 recites, "designating a coset of the at least one constellation using the FEC coded bit signals". Merriam-Webster's dictionary defines coset as a subset of a mathematical group that consists of all the products obtained by multiplying either on the right or the left a fixed element of the group by each of the elements of a given subgroup. Nowhere in the application does the applicant teach such a structure. For now, the Examiner assumes that the Applicant intended subset in place of coset. Claims 2-12 depend from claim 1, hence inherit the deficiencies in claim 1.

Claim 11 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 11 recites, "a parity check matrix of the LDPC code has an equal number of branches connecting at least one information bit and at least one parity bit with at least one parity node". Nowhere does the Applicant teach a parity check matrix having branches. An LDPC matrix is an array with ones and zeros arranged in columns and rows.

Claim 12 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 12, "a parity check matrix contains at least one parity node connected to an equal number of information bits and parity bits". Nowhere does the Applicant teach a parity check matrix having at least one parity node. An LDPC matrix is an array with ones and zeros arranged in columns and rows.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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8. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "coset" in claim 1 is used by the claim to mean "subset", while the accepted meaning is "a subset of a mathematical group that consists of all the products obtained by multiplying either on the right or the left a fixed element of the group by each of the elements of a given subgroup. Nowhere in the application does the applicant teach such a structure." The term is indefinite because the specification does not clearly redefine the term.

Claim 3 recites, "the LDPC code has an equal BER for one or more information bits and one or more parity bits". BER is defined as the number of errors in the total transmitted bits; hence it is unclear what equal BER refers to. The Examiner assumes the Applicant intended: -- the LDPC code has a BER for one or more information bits and one or more parity bits --.

Claims 2-12 depend from claim 1, hence inherit the deficiencies in claim 1.

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Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. Claim 1 recites, "designating a coset of the at least one constellation using the FEC coded bit signals". The omitted structural cooperative relationships are: the relationship between "designating a coset" and modulating data bit signals onto a constellation.

Claims 2-12 depend from claim 1, hence inherit the deficiencies in claim 1.

Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. Claim 3 recites, "the LDPC code has an equal BER for one or more information bits and one or more parity bits". The omitted structural cooperative relationships are: the relationship between "an unequal BER" and "one or more information bits and one or more parity bits". That is does the "unequal BER" refer to various subsets within the "one or more information bits and one or more parity bits" and if so what subsets does it refer to?

Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP

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§ 2172.01. Claim 11 recites, “a parity check matrix of the LDPC code has an equal number of branches connecting at least one information bit and at least one parity bit with at least one parity node”. The omitted structural cooperative relationships are: the relationship between “a parity check matrix”, “branches”, “at least one information bit and at least one parity bit” and “at least one parity node”.

Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP

§ 2172.01. Claim 12, “a parity check matrix contains at least one parity node connected to an equal number of information bits and parity bits”. The omitted structural cooperative relationships are: the relationship between “a parity check matrix”, “at least one parity node” and “of information bits and parity bits”.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Asada; Haruhiko H. et al. (US 6553535 B1, hereafter referred to as Asada).

35 U.S.C. 102(e) rejection of claims 1 and 2.

Asada teaches a method of combined modulation (Step 850 in Figure 8 in Asada) and Forward Error Correction, FEC coding (Step 810 in Figure 8 in Asada; Note: Columns 7 and 8 in Asada teach that Figure 8 is a method of combined modulation and Forward Error Correction), of data bit signals for transmission over a communications channel (Figure 8 in Asada teaches a method of combined modulation and Forward Error Correction, FEC coding, of data bit signals for transmission over a communications channel) comprising: FEC coding a subset of the data bit signals using an LDPC code to produce FEC coded bit signals (col. 7, lines 17-19 in Asada teach that error correction parity is added to blocks of message bits; Note: blocks of message bits are subset blocks of the data bit message signals; col. 8, lines 7-11 in Asada teach that Figure 8 is applicable to LDPC codes); modulating the data bit signals and the FEC coded bit signals using at least one constellation that contains more than one bit signal (Step 850 in Figure 8 in Asada is a modulation step for modulating the data bit signals and the FEC coded bit signals; col. 9, lines 48-50 in Asada teach block-coded modulation schemes create codeword arrays where the columns of the arrays are mapped to signal points from a signal constellation as in Figure 11 of Asada); and designating a coset of the at least one constellation using the FEC coded bit signals (the codeword array in Figure 11 of Asada is mapped into a constellation by mapping

each column which is a subset of the matrix onto the constellation, hence each column is a "coset").

35 U.S.C. 102(e) rejection of claim 3.

Information symbols always have a bit error rate.

35 U.S.C. 102(e) rejection of claim 4.

Step 810 in Figure 8 of Asada for determining the block code is a configuration stage (Note: a low density parity check code is inherently determined by its parity check matrix).

35 U.S.C. 102(e) rejection of claim 5.

Step 810 in Figure 8 of Asada for determining the block code is a configuration stage (Note: a low density parity check code is inherently determined by its parity check matrix and a generator matrix is inherently determined the parity check matrix, furthermore and alternatively a block code is inherently determined by it generator matrix).

35 U.S.C. 102(e) rejection of claim 6.

Step 810 in Figure 8 of Asada for determining the block code is a configuration stage (Note: a low density parity check code is inherently determined by its parity check matrix). Claim 8 in Asada teaches constructing a set of codewords having a length based upon a coding scheme wherein the length of the codewords is constrained by the

number of symbols and a given transmission rate for a channel. Note: the length determines the latency of the codeword since it is the number of symbols.

35 U.S.C. 102(e) rejection of claim 7.

Step 810 in Figure 8 of Asada for determining the block code is a configuration stage (Note: a low density parity check code is inherently determined by its parity check matrix and a generator matrix is inherently determined the parity check matrix, furthermore and alternatively a block code is inherently determined by it generator matrix). Claim 8 in Asada teaches constructing a set of codewords having a length based upon a coding scheme wherein the length of the codewords is constrained by the number of symbols and a given transmission rate for a channel. Note: the length determines the latency of the codeword since it is the number of symbols.

35 U.S.C. 102(e) rejection of claim 8.

Claim 8 in Asada teaches constructing a set of codewords having a length based upon a coding scheme wherein the length of the codewords is constrained by the number of symbols and a given transmission rate for a channel.

35 U.S.C. 102(e) rejection of claim 9.

Claim 8 in Asada teaches constructing a set of codewords having a length based upon a coding scheme wherein the length of the codewords is constrained by the number of

symbols and a given transmission rate for a channel. Note: the length determines the latency of the codeword since it is the number of symbols.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Asada; Haruhiko H. et al. (US 6553535 B1, hereafter referred to as Asada) in view of Applicant's admitted Prior Art.

35 U.S.C. 103(a) rejection of claim 10.

Asada substantially teaches the claimed invention described in claims 1-9 (as rejected above).

However Asada does not explicitly teach the specific use of LDPC codes having no cycles.

The Applicant's admitted Prior Art teaches LDPC codes having no cycles and teaches that one of ordinary skill in the art at the time the invention was made would have been highly motivated to use such codes since they have no error floor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Asada with the teachings of the Applicant's admitted Prior Art by including use of LDPC codes having no cycles. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that use of LDPC codes having no cycles would have provided a code with no error floor.

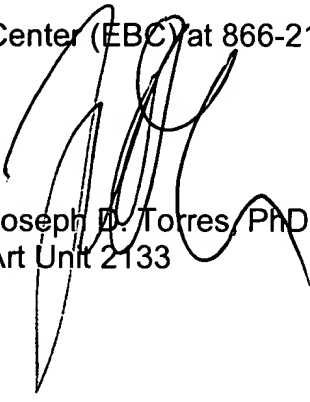
Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (703) 308-7066. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Joseph D. Torres, PhD
Art Unit 2133